

BAB IX

PERHITUNGAN PONDASI TELAPAK P1

9.1 Beban yang Bekerja (ETABS)

$$P_u := 1512.57 \text{ kg}$$

9.2 Kontrol dimensi pondasi

Dimensi pondasi

$$B := 60 \text{ cm} \quad L := 100 \text{ cm}$$

$$A := B \cdot L = 6000 \text{ cm}^2$$

$$W_x := \frac{B \cdot L^2}{6} = 100000 \text{ cm}^3$$

$$W_y := \frac{L \cdot B^2}{6} = 60000 \text{ cm}^3$$

Tegangan yang terjadi

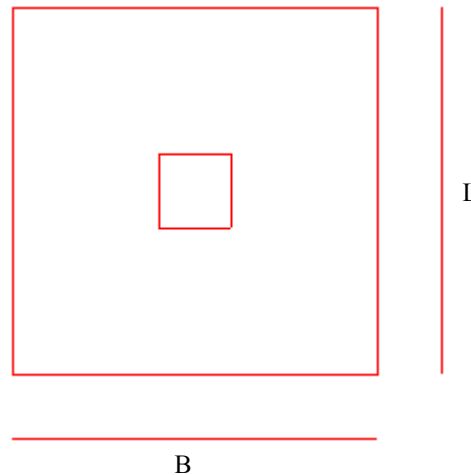
$$\sigma_{\max} := \frac{P_u}{A} = 0.252 \text{ kg/cm}^2$$

Tegangan ijin tanah (data sondir kedalaman 1.5 m)

$$q_c := 5.163 \text{ kg/cm}^2$$

$$SF := 3$$

$$q_{\text{ijin}} := \frac{q_c}{SF} = 1.721 \text{ kg/cm}^2 > \sigma_{\max} = 0.252 \text{ kg/cm}^2 \quad \text{OK!!}$$



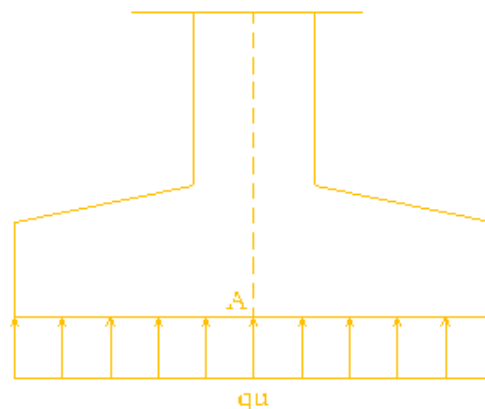
9.3 Penulangan Pondasi telapak

Momen pada pondasi (momen pada POT. A) :

$$q_u := \sigma_{\max} \cdot 1000 = 252.095 \text{ kg/m}$$

$$M_p := \frac{q_u \cdot l^2}{2} = 126.048 \text{ kgm}$$

$$M_{\text{ult}} := 1.2 \cdot M_p = 151.257 \text{ kgm}$$



Adapun data - data perencanaan untuk penulangan pondasi :

- Tebal pelat : $h := 250 \text{ mm}$
- Tebal decking $s := 50 \text{ mm}$
- Diameter tulangan rencana $\Phi 12$

- Mutu tulangan baja $f_y := 390 \text{ Mpa}$
- Mutu beton $f_c := 18.675 \text{ Mpa}$

$$d_{\text{sken}} := 70 + 6 = 76 \text{ mm}$$

$$d := h - d_{\text{sken}} = 174 \text{ mm}$$

$$b := 1000 \text{ mm}$$

$$\beta := 0.85$$

Berdasarkan SNI 2847 pasal 10.4.3 :

$$\rho_{\text{balance}} := \frac{0.85 \cdot \beta \cdot f_c \cdot \left(\frac{600}{600 + f_y} \right)}{f_y} = 0.021$$

$$\rho_{\text{max}} := 0.75 \cdot \rho_{\text{balance}} = 0.016$$

Berdasarkan SNI 03-2847-2002 pasal 9.12.2

$$\rho_{\text{min}} := \frac{1.4}{f_y} = 0.0036$$

$$m := \frac{f_y}{0.85 \cdot f_c} = 24.569$$

$$M_n := \frac{\text{Mult} \cdot 9.81 \cdot 1000}{0.8} = 1854788.963 \text{ Nmm}$$

$$R_n := \frac{M_n}{b \cdot d^2} = 0.061 \text{ N/mm}^2$$

$$\rho := \frac{\left(1 - \sqrt{1 - \frac{2m \cdot R_n}{f_y}} \right)}{m} = 0.00016$$

$$\rho = 0.00016 < \rho_{\text{min}} = 0.0036$$

$$A_{\text{perlu}} := \rho_{\text{min}} \cdot b \cdot d = 624.615 \text{ mm}^2$$

jadi pasang tulangan lentur $\Phi 12-150$

$$A_{\text{pspg}} := 7 \cdot 0.785 \cdot 12^2 = 791.28 \text{ mm}^2$$

9.4 Kontrol geser pons

- Beban Aksial Kolom

Perencanaan penampang akibat geser didasarkan pada beban aksial kolom

$$N_{uk} := 129.939 \text{ kN}$$

- Dengan persyaratan $V_u < V_c$ (gaya geser ultimate harus lebih kecil dari kuat geser nominalnya).

$$\text{tebal pondasi } t_p := 25 \text{ mm}$$

$$\text{dimensi kolom } 15/15 \text{ cm}$$

$$b_o := 0.5 \cdot t_p + 15 + 0.5 \cdot t_p = 40 \text{ cm}$$

$$d_o := 0.5 \cdot t_p + 15 + 0.5 \cdot t_p = 40 \text{ cm}$$

- Keliling Kritis

$$U := 2 \cdot (b_o + d_o) = 160 \text{ cm}$$

- Luas Kritis

$$A_k := U \cdot t_p = 4000 \text{ cm}^2$$

- Kekutan Geser Beton

$$\beta_c := \frac{15}{15} = 1$$

$$d := t_p - 7 - 1.2 = 16.8 \text{ cm}$$

$$V_c := \frac{\sqrt{f_c} \cdot U \cdot d \cdot 100 \cdot \left(1 + \frac{\beta_c}{2}\right)}{6 \cdot 10^3} = 290.402 \text{ kN} \quad \text{..... SNI 2847 pasal 13.12.2.1}$$

Syarat $V_u \leq \phi V_c$

$$\phi := 0.75$$

$$N_{uk} = 129.939 \text{ kN} \quad \blacksquare < \blacksquare \quad \phi \cdot V_c = 217.801 \text{ kN} \quad \text{..... OK!!!}$$

